

FCX-AIIe SERIES

Pressure Transmitter

The FCX-AIIe pressure transmitter accurately measures gauge pressure and transmits a proportional 4 to 20 mA signal. The transmitter combines a unique silicon micro-machined capacitance sensor with state-of-the-art microprocessor technology to provide exceptional performance and reliability.



Features

High Performance

Combine the proven variable capacitance measurement principle with a sensor machined from a single silicon wafer and the result is a performance specification traditionally reserved for the elite class transmitter. The standard accuracy of the FCX-AIIe is $\pm 0.1\%$ and long term stability is $\pm 0.2\%$ for three years.

Isolated Sensor

The "Advanced Floating Cell" serves to increase the mechanical integrity of the measuring cell by isolating the silicon sensor from adverse conditions present in normal process applications. This unique cell construction reduces total measurement error by minimizing the effects of varying process temperature, static pressure, and overpressure.

Communication Protocols

The FCX-AIIe communicates in both Fuji proprietary and HART® protocol. Any HART® compatible device can communicate with the FCX-AIIe.

Application Flexibility

Various features and options make the FCX-AIIe suitable for a wide variety of process applications:

- All 316 and 316L SST wetted parts
- 30:1 turndown for all ranges
- Analog indicator orients in either the vertical or horizontal plane.
- Full range of hazardous area approvals
- RFI filter and lightning arrester
- 5-digit LCD meter with support for engineering units

Burnout Flexibility

The AIIe's burnout signal is adjustable via the hand held communicator to either under scale (3.2 to 3.8 mA) over scale (20.8 to 21.6 mA) or output hold (last value) complying with NAMUR NE43.



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Specifications

FUNCTIONAL SPECIFICATIONS

Service

Liquid, gas, or vapor

Gauge pressure span and over range limit

GAUGE PRESSURE									
Range Code	Calibrated Span						Overrange Limit		
	Minimum			Maximum					
	psi	kPa	Bar	psi	kPa	Bar	psi	kPa	Bar
02	2.32	16.5	0.16	72	500	5	220	1.5	15
03	14.5	100	1	435	300	30	1300	9	90
04	50	330	3.3	1500	10000	100	2200	15	150

Vacuum Limitation

Silicone fill sensor:
(see diagram)

Fluorinated fill sensor:

66 kPa abs /

500mm Hg abs /

9.6 PSI ab

at 60°C max.

Output signal

4 to 20mA DC c/w

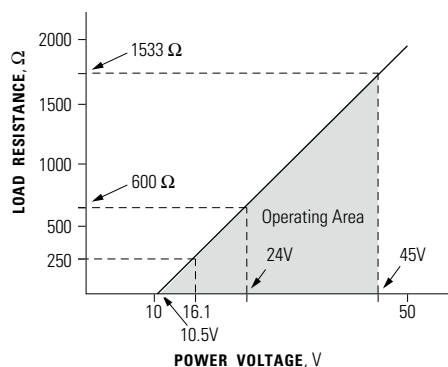
HART & Fuji Protocol

Power supply

Transmitter operates
on 10.5V to 45V DC at
transmitter terminals.

10.5V to 32V DC for the units with optional arrester.

Load limitations: see figure below



Note: For communication with HHC(1) (Model: FXW), min. of 250 Ω required.

Hazardous locations (some approvals pending)

Authorities	Flameproof	Intrinsic safety	Type N Nonincendive
ATEX	Ex II 2 G and D — EExd IIC T5/T6	Ex II 1 G and D — EExia IIC T4/T5	Ex II 3 G and D — EExn IIC T4/T5
Factory Mutual	Class I II III Div. 1	Class I II III Div. 1	Class I II III Div. 2
CSA	Groups B thru. G Class I II III Div. 1	Groups A thru. F Class I II III Div. 1	Groups A thru. G Class I II III Div. 2
	Groups C thru. G	Groups A thru. G	Groups A thru. G

Zero/span adjustment:

Adjustable via the HHC or external adjustment screw.

Damping:

Adjustable between 0 to 32 seconds via the HHC

Zero elevation/suppression:

–100% to +100% of URL. Zero plus span not to exceed URL.

Normal/reverse action

Selectable from the HHC

Burnout direction

Selectable from the HHC.

If self-diagnostic detects transmitter failure, the analog signal will be driven to either “Output Hold” (last value), “Output Overscale” (between 20.8mA to 21.6mA) or “Output Underscale” (between 3.2 mA to 3.8 mA).

Loop-check output

Any constant signal between 3.8mA and 21.6mA via the HHC.

Temperature limit

Ambient: –40 to +85°C (–40 to +185°F)

–20 to +80°C (–4 to +176°F) for LCD indicator

–40 to +60°C (–40 to +140°F) for arrester option

–10 to +60°C (–14 to +140°F) for fluorinated oil filled transmitters

For explosion-proof units (flameproof or intrinsic safety), ambient temperature must be within the limits specified in each standard.

Process: –40 to +120°C (–40 to +248°F) for silicone fill sensor

–20 to +80°C (–4 to +176°F) for fluorinated oil fill sensor

Storage: –40 to +90°C (–40 to +194°F)

Humidity limit

0 to 100% RH

Communication

Hart or Fuji proprietary protocol.

Programmable output linearization function:

Output signal can be characterized with a 14 point linear approximation function from the HHC.

PERFORMANCE SPECIFICATIONS

Reference conditions, silicone oil fill, 316SS isolating diaphragms, 4 to 20mA analog output in linear mode.

Accuracy rating: (including linearity, hysteresis, and repeatability)

For spans greater than 1/10 of URL: ±0.1% of span

For spans below 1/10 of URL:

$$\pm \left(0.05 + 0.05 \frac{0.1 \times \text{URL}}{\text{span}} \right) \% \text{ of span}$$

Stability:

± 0.2% of upper range limit (URL) for 3 years.

Temperature effect:

Effects per 28°C (82°F) change between the limits of
–40°C and 85°C (–40°F and 185°F)

Zero shift;

Total effect;

$$\pm \left(0.1 + 0.025 \frac{\text{URL}}{\text{span}} \right) \% \quad \pm \left(0.125 + 0.025 \frac{\text{URL}}{\text{span}} \right) \%$$

Over range effect

Zero shift of $\pm 0.3\%$ of URL for any over range to maximum limit.

Supply voltage effect

Less than 0.005% of calibrated span per 1V

RFI effect

Less than 0.2% of URL for the frequencies of 20 to 1000MHz and field strength of 30 V/m with electronics cover on.

(CE compliant with directive 89 / 339 / EEC electromagnetic compatibility)

Step response (without electrical damping)

Time constant: 0.2 sec.

Dead time: Approximately 0.2 sec.

Mounting position effect

Zero shift, correctable less than 0.1 kPa / 1 m bar / 0.4" w.c. for a 10° tilt in any plane. Error can be corrected by adjusting zero.

No effect on span.

Dielectric strength:

500V AC, 50/60Hz 1 min., between circuit and earth.

Insulation resistance:

More than 100M Ω at 500V DC.

Turn-on time:

4 sec.

Internal resistance for external field indicator:

12 Ω or less

PHYSICAL SPECIFICATIONS**Electrical connections:**

G1/2, 1/2-14 NPT, Pg13.5, or M20 x 1.5 conduit, as specified.

Single conduit.

Process connections:

1/4-18 NPT or Rc1/4 on 54mm (2-1/8") centers, as specified.

Meets DIN 19213.

Process-wetted parts material:

Material code (7th digit in Code symbols)	Process cover	Diaphragm	Wetted sensor body	Vent/drain
V	316 stainless steel	316L stainless steel	316 stainless steel	316 stainless steel

Sensor O-rings: Viton O-ring or Teflon gasket.

Non-wetted parts material:

Electronics housing: Low copper die-cast aluminum alloy finished with epoxy/polyurethane double coating.

Bolts and nuts: Cr-Mo alloy (standard), or 304 stainless steel or 630 stainless steel.

Fill fluid: Silicone oil (standard) or fluorinated oil

Mounting bracket: 304 stainless steel

Environmental protection

IEC IP67

Mounting

On 60.5mm (2") pipe using mounting bracket, direct wall mounting, or direct process mounting.

Mass{weight}:

Transmitter approximately 4.4kg (9 lbs) without options.

OPTIONAL FEATURES**Indicator:**

Analog indicator (1.5% accuracy).

Digital indicator (5 digit LCD).

Arrester:

Lightning surge immunity: 4kV (for 50 μ s duration)

Oxygen service:

Process wetted parts oil-free. The fill fluid is fluorinated oil.

Chlorine service:

The fill fluid is fluorinated oil.

Degreasing:

Process-wetted parts oil-free, standard fill fluid silicone oil. Not for use on oxygen or chlorine measurement.

NACE specification:

Metallic materials for all pressure boundary parts comply with NACE MR-01-75. ASTM B7M or L7M bolts and 2HM nuts (Class II) are available.

Optional tag plate:

An extra stainless steel tag with customer tag data is attached to the transmitter.

Accessories**Flange adapters:**

Converts process connection to 1/2-14 NPT in carbon steel or in 316 stainless steel.

Hand-held communicator:

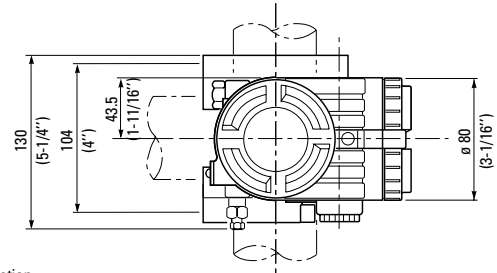
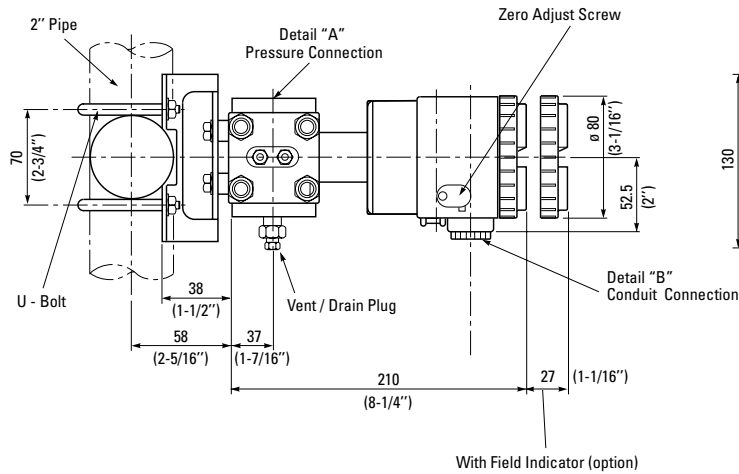
Installed with Fuji Proprietary Protocol.

Code Symbols

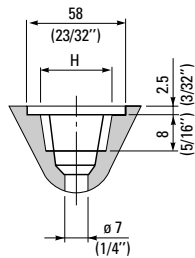
DIGIT	DESCRIPTION	ORDER CODE										1	2	3	4	5	6	7	8	—	9	10	11	12	13	—	14	15	—	16	
	Base Type	4-20 mA, Smart (w/digital signal)										F	H	G				V	4	—							—			—	
4	Connections	Process Rc 1/4 1/4-18 NPT 1/4-18 NPT 1/4-18 NPT 1/4-18 NPT	Conduit (1) G 1/2 (1) Pg 13.5 (1) M20 X 1.5 (1) Pg 13.5 (1) 1/2-14 NPT	Adapt Screw 7/16-20 UNF M10 / M12 M10 / M12 7/16-20 UNF 7/16-20 UNF					A C D E F																						
5, 6	Ranges	Pressure (FKP / FHP) 2.32 to 72 psi 14.5 to 435 psi 50 to 1500 psi		Over-range Limit 210 1300 2100					0 0 0	2 3 4																					
7	Materials	Process Cover 316 SST	Diaphragm 316L SST	Wetted Cell Body 316 SST							V																				
8	Version														4																
9	Indicator and Arrester	Indicator None Analog, 0 to 100% Linear Scale Analog, Custom Scale None Analog, 0 to 100% Linear Scale Analog, Custom Scale Digital, 0 to 100% Digital, Custom Scale Digital, 0 to 100% Digital, Custom Scale		Arrester None None None Yes Yes Yes None None Yes Yes							A B D E F H L P Q S																				
10	Approvals	FM, Flameproof (or explosionproof) CSA, Explosionproof, Intrinsically Safe and Non-Incendive ATEX, Flameproof FM, Intrinsically Safe and Non-Incendive ATEX, Intrinsically Safe ATEX, Type N												D E X H K P																	
11	Mounting Bracket	Vent / Drain None None Side Side		Mounting Bracket None SS None SS							A C D F																				
12	SST Parts	Housing Standard SS Standard SS		Cell Coating None None Yes Yes							Y C M P																				
13	Special Treatment and Fill fluid	Treatment None Degreasing Oxygen Service		Fill Fluid Silicone Oil Silicone Oil Fluorinated Oil									Y G A																		
14	Sensor O-Ring	Viton Teflon																				A B									
15	Bolt / Nuts	Standard (Cr-Mo Alloy, HexagonSocket Head Cap Screw / Carbon Steel Nut) Cr-Mo Alloy, Hexagon bolt / Nut NACE Bolt / Nut (ASTM A193 B7M / A194 2HM) NACE Bolt / Nut (ASTM A320 L7M / A194 2HM) 304 SST / 304 SST ¹ 630 SST / 304 SST ¹																				A B C D E F									
16	Special Options ²	Tropicalization ¹ With Material Certificates NACE Certification Cass III Bolting NACE Certification c/w Class I MP35N Bolting Special Option (Specify)																									S A C N X				

Outline Diagram

FCX-A11e Pressure Transmitter

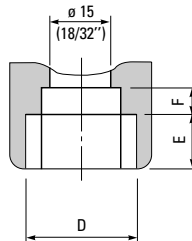


Detail "A"
(Pressure Connection)



See Table 1

Detail "B"
(Conduit Connection)



See Table 1

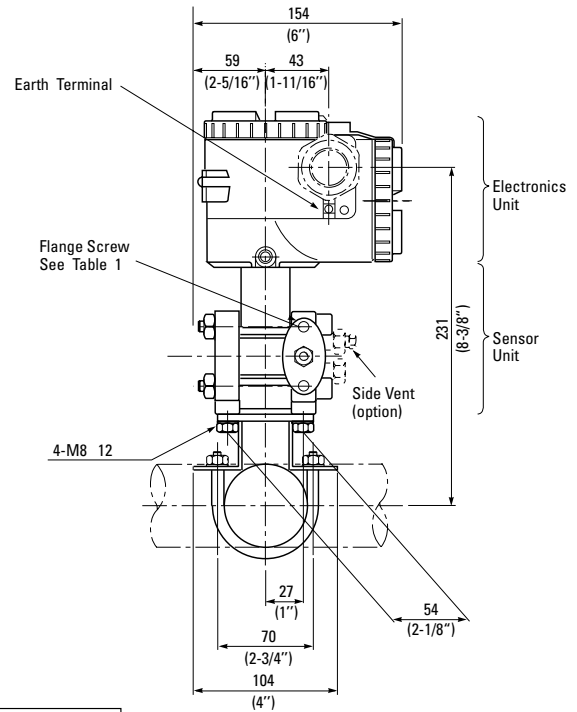
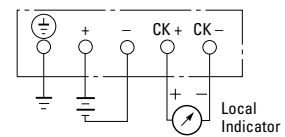


TABLE 1

4th Digit of the Code Symbols	Conduit Connection			Press. Conn.	Flange Screw
	D	E	F		
A	G 1/2	17 (21/32")	8 (5/16")	RC 1/4	7/16-20UNF Screw depth 15 (1/2")
C	1/2-14NPT	16 (5/8")	5 (3/16")	1/4-18NPT	7/16-20UNF Screw depth 15 (1/2")
D	Pg 13.5	8 (5/16")	4.5 (11/64")	1/4-18NPT	M10 Screw depth 15 (1/2")
E	M20 x 1.5	16 (5/8")	5 (3/16")	1/4-18NPT	M10 Screw depth 15 (1/2")
F	Pg 13.5	8 (5/16")	4.5 (11/64")	1/4-18NPT	7/16-20UNF Screw depth 15 (1/2")

CONNECTION DIAGRAM



These Barton products are represented in your area by:

Barton Instrument Systems designs, manufactures, sells and services precision instrumentation for the control and measurement of process variables including: pressure, level, flow, differential pressure, temperature and density. The technical and sales success of the FCX series of transmitters is the result of a long term strategic partnership between Barton and Fuji Electric. As the exclusive North American representative of Fuji transmitters, Barton is proud to offer this technically superior and cost competitive product line.



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